DCA70SSJU4i

19.6 kW Load Bank Installation

The following instructions are intended to assist the user in the installation of the 19.6 kW Load Bank for use on the DCA70SSJU4i generators. Please read all assembly instructions before installing load bank.

REQUIRED TOOLS

- Ratchet Set
- Power Drill
- Flat/Phillips Screwdrivers
- 2-Inch Chassis Punch
- Wire Cutters

PARTS

Verify that all parts are accounted for. See Figure 1 and Table 1.

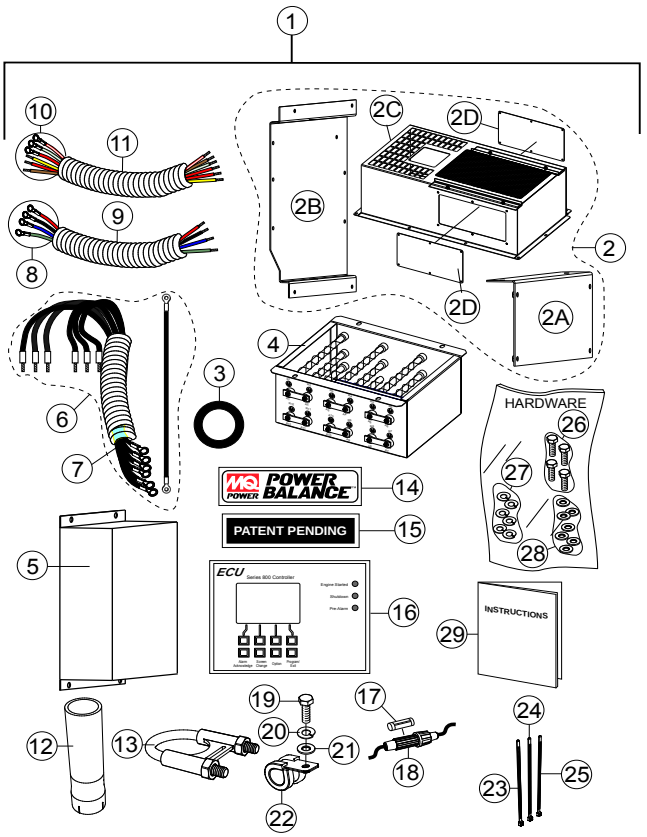

Figure 1. Power Balance Kit (DCA70SSJU4i)

WORK SAFELY!

Only a **qualified service technician** with proper training should perform this installation. Follow all shop safety rules when performing this installation.

PREPARATION

1. Make sure generator is turned off and engine is cool.
2. Place the generator in an area free of dirt and debris. Make sure it is on secure level ground with chock blocks underneath each wheel to prevent the generator from rolling.
3. Disconnect negative battery cable from the battery.

Table 1. Power Balance Kit

Item No.	Part No.	Description	QTY.	Remarks
1	MQPPB70J4I	KIT, POWER BALANCE, 19kW	1	Includes Items 2-6,8,10,12-18, 29
2	70SSJU4IPB-SKIT	Kit,Sheet Metal,Power Balance	1	Includes Items 2A-2D
2A	EE58360	Angle, Contactor Box Support	1	
2B	EE58359	Bracket, Contactor Box,14x16"	1	
2C	EE58361	Cover, Roof,19 kW Resistor	1	
2D	EE58362	Cover Plate, 2-Row Resistor	2	
3	EE58673	2" Rubber Grommet	1	
4	EE58325	Resistor Assy. 19 kW	1	
5	EE58364	Contactor Assy. 19 kW	1	
6	EE58365	Load Bank Wire Harness, 10 AWG.	1	7 Wires
7		Load Bank Split Loom, 3/4" X 126"	126"	Obtain Locally
8	EE58515	Power Wires (UVW-GND), 8 AWG.	1	4 Wires
9		UVW-GND Split Loom, 3/4" X 40"	40"	Obtain Locally
10	EE58517	DC Control Wires, 16 AWG.	1	6 Wires
11		DC Control Split, Loom, 3/8" X 54"	54"	Obtain Locally
12	EE58370	Tailpipe Extension, 3" Dia. X 13" SS	1	
13	EE16745	Clamp,U-Style, 3" Zinc	1	
14	EE57143	Decal Power Balance, 5.4" X 1.5"	1	
15	EE57145	Decal Patent Pending, 2.70" X 0.55"	1	
16	ECU835	ECU Module	1	
17		Fuse, 10 AMP (AGC10)	1	Obtain Locally
18	303110	Fuse Holder, In-Line, 10 AMP	1	Includes Item 17
19		3/8" X 20 Bolt	1	Obtain Locally
20		3/8" Lock Washer	1	Obtain Locally
21		3/8" Flat Washer	1	Obtain Locally
22		G-Clamp 3/8-16"	1	Obtain Locally
23		Tie Wrap, #4	6	Obtain Locally
24		Tie Wrap, #6	10	Obtain Locally
25		Tie Wrap, #8	10	Obtain Locally
26		6mm X 15M Screw	21	Obtain Locally
27		6mm X 15M Lock Washer	21	Obtain Locally
28		6mm X 15M Flat Washer	21	Obtain Locally
29	EE58627	Work Instructions, Power Balance	1	

FRONT PANEL REMOVAL (TOW SIDE)

1. Locate the generator front panel as shown in Figure 2.
2. Remove the 12 screws (Figure 2) that secure the ***front panel*** to the cabinet housing.

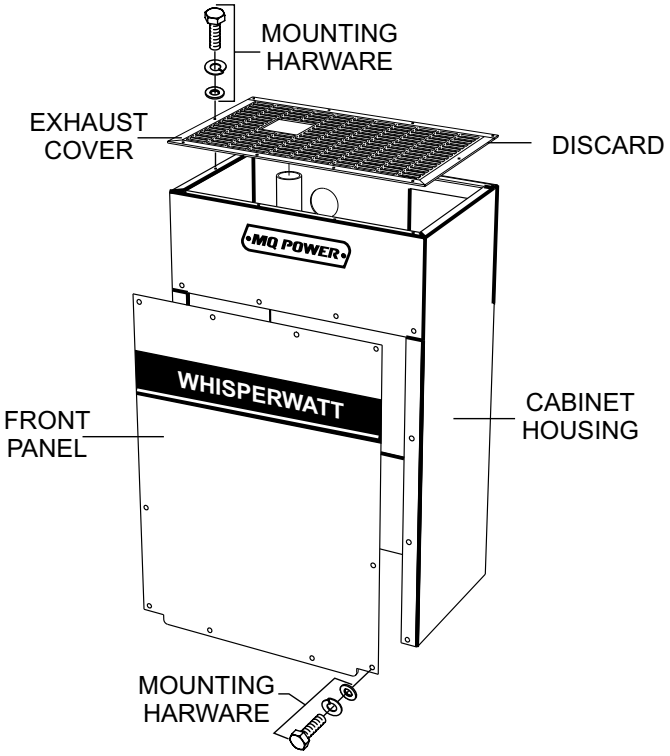

Figure 2. Front Panel/Exhaust Cover Removal

3. Remove front panel, set aside where it will not get damaged.

FRONT FRAME EXHAUST COVER REMOVAL

1. Remove the 10 screws that secure the ***exhaust cover*** (Figure 2) to cabinet housing.
2. Retain mounting hardware.
3. Discard front frame exhaust cover.

MUFFLER TAIL PIPE EXTENSION INSTALLATION

1. Locate muffler tail pipe extension (P/N EE58370).
2. Place the flanged end over the existing muffler pipe section as shown in Figure 3.

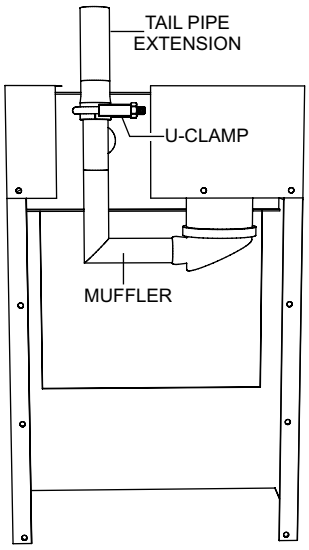

Figure 3. Tail Pipe Extension

3. Secure tail pipe extension with U-Clamp (P/N EE16745).

GROMMET INSTALLATION

1. Using a chassis punch or equivalent tool, cut a 2-inch diameter hole into the front frame cabinet sheet metal as shown in (Figure 4).

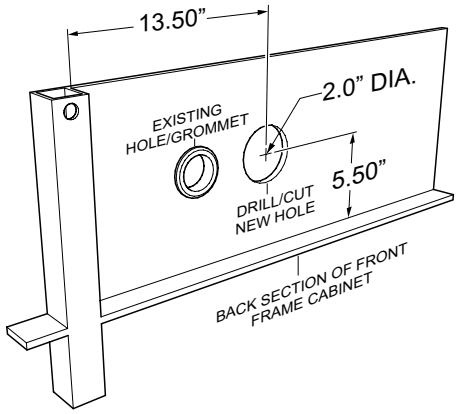

Figure 4. 2-Inch Diameter Hole Cut-Out

2. Remove any sharp edges from the hole opening.
3. Insert 2-inch diameter rubber grommet (P/N EE58673) into hole opening.

ANGLE BRACKET INSTALLATION P/N EE58360

1. Located underneath the ***voltage selector switch J-box*** there should be an existing support angle bracket (Figure 5).

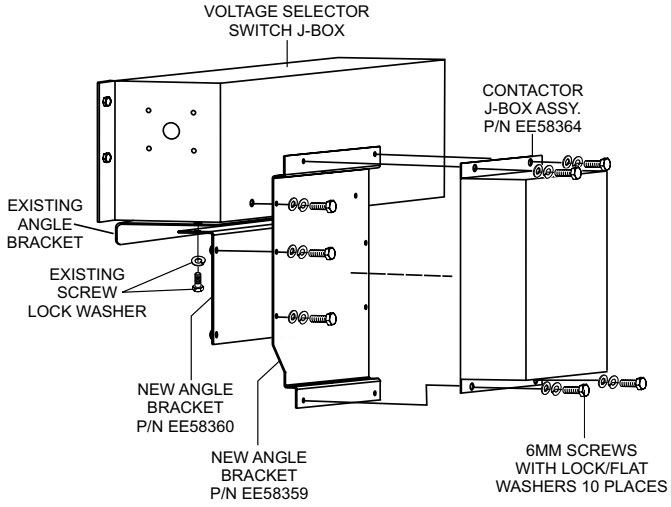
VOLTAGE SELECTOR SWITCH J-BOX
CONTACTOR J-BOX ASSY. P/N EE58364
EXISTING ANGLE BRACKET
EXISTING SCREW LOCK WASHER
NEW ANGLE BRACKET P/N EE58360
NEW ANGLE BRACKET P/N EE58359
6MM SCREWS WITH LOCK/FLAT WASHERS 10 PLACES

Figure 5. Mounting Brackets

2. Remove the bottom screws (2) on the existing J-box support angle bracket as shown in Figure 5.
3. Next, attach angle bracket (P/N EE58360) to the existing J-box support angle bracket using the hardware that was removed in step 2.

ANGLE BRACKET INSTALLATION P/N EE58359

1. Using 6MM screw (6) with lock washers and flat washers, attach angle bracket (P/N EE58359) onto newly installed angle bracket (P/N EE58360).
2. Tighten all screws securely.

CONTACTOR J-BOX INSTALLATION P/N EE58364

1. Using 6MM screw (4), install Contactor J-Box (P/N EE58364) (Figure 5) onto angle bracket P/N EE58359.

RESISTOR LOAD BANK WIRING

There are seven ***BLACK 10 AWG*** wires that need to be connected to Resistor Load Bank P/N (EE58325). Six of the wires are to be connected to the 12 resistors located inside the load bank, the remaining wire will be connected to chassis ground.

Connect the 6 resistor load wires and ground wire as follows:

1. Place the Resistor Load Bank with the Side-A facing as shown in Figure 6.

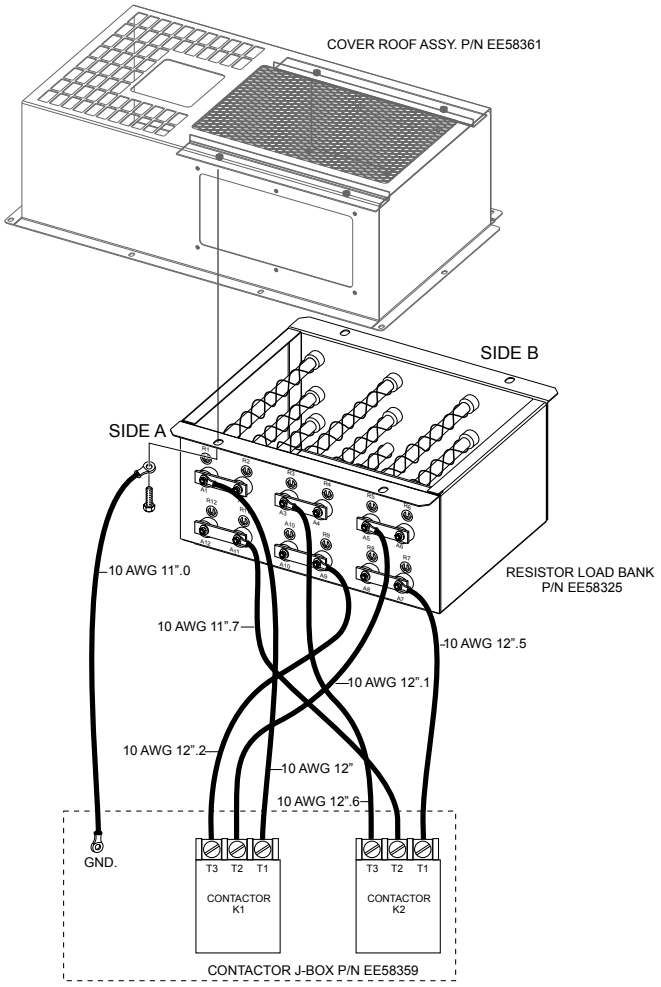

Figure 6. Load Bank Connections

2. Insert these seven wires into the 10.5" ***Load Bank split-loom harness*** (P/N EE58635).
3. Once the wires have been inserted into the load bank split-loom harness secure using tie-wraps.
4. Next, attach the six wires to the Resistor Load Bank as referenced in Figure 6 and Table 2. Please reference the labeling and length of each wire.

Table 2. Resistor Load Bank Wiring

Resistor/GND.	Load Bank Position	Wire Length (ft.) Black 10 AWG
R1	A1	12.0
R3	A3	12.6
R5	A5	12.1
R7	A7	12.5
R9	A9	12.2
R11	A11	11.7
GND	GND Screw	11.0

5. To prevent arcing, tighten all nuts securely.

ROOF COVER/RESISTOR LOAD BANK INSTALLATION

Use the procedure below to mount the Resistor Load Bank (P/N EE58325) into the Roof Cover (P/N EE58361).

1. Lift the Resistor Load Bank (Figure 7) upward and align mounting ear holes with flange bracket holes on Roof Cover.
2. Secure Resistor Load Bank to Roof Cover using three 6MM hex head screws. The fourth 6MM screw is for the GND. wire.

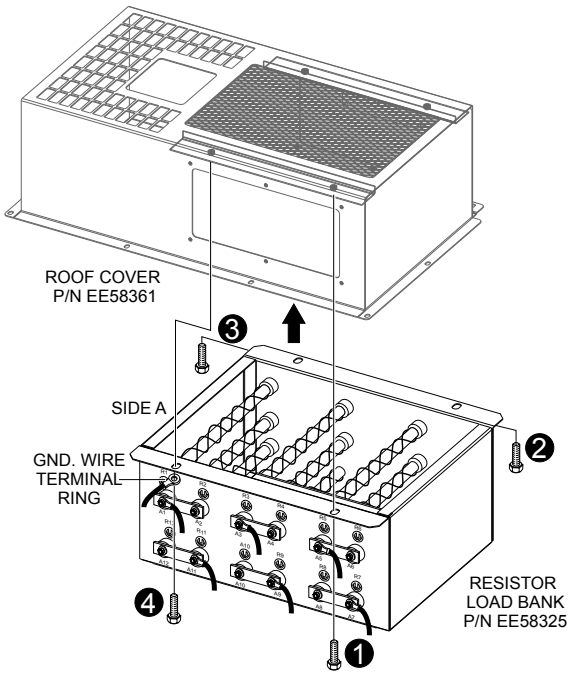

Figure 7. Roof Cover/Resistor Load Bank Installation

3. Connect the ground wire to the Resistor Load Bank as referenced in (Figure 7).
4. Using 6MM screw (12) with lock washers and flat washers (Figure 8), install Cover Plate (P/N EE58362) onto A and B sides of Roof Cover (P/N EE58361).

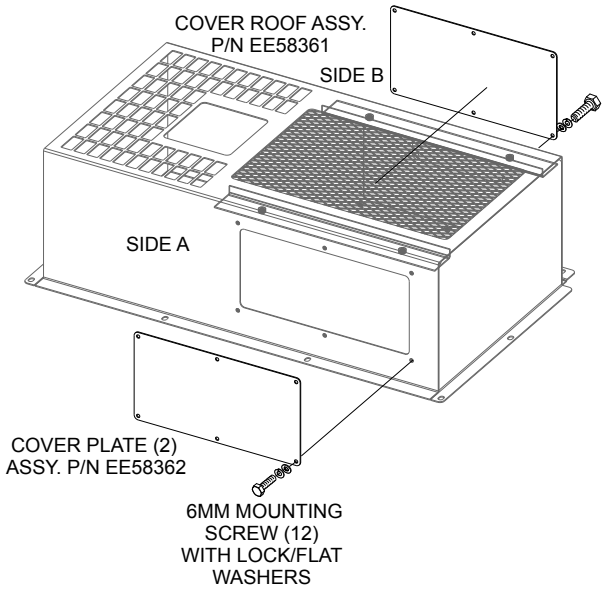

Figure 8. Cover Plate Mounting

5. Place and align the Roof Cover (P/N EE58361) on top of cabinet housing as shown in Figure 9.

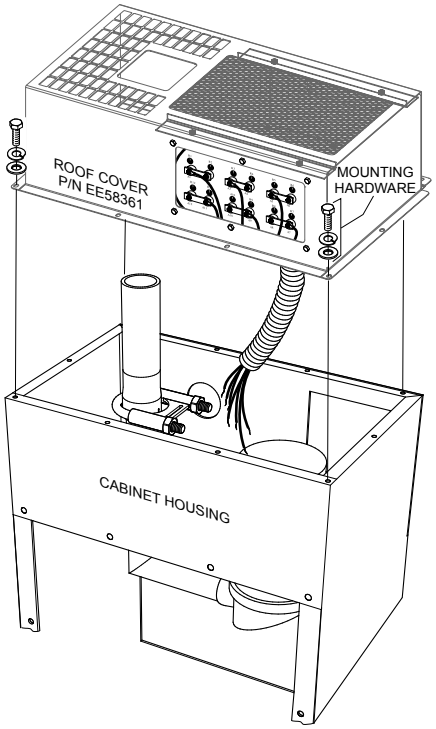

Figure 9. Roof Cover Mounting

6. Use the mounting hardware removed in the "Front Frame Exhaust Cover", step 2 to secure the Roof Cover to the cabinet housing.
7. Tighten all screws securely.

RESISTOR LOAD BANK WIRE HARNESS ROUTING

1. There should now be seven wires connected to the Resistor Load Bank.
2. Route the load bank split-loom harness (Figure 10) through the 2-inch rubber grommet on the front frame cabinet.

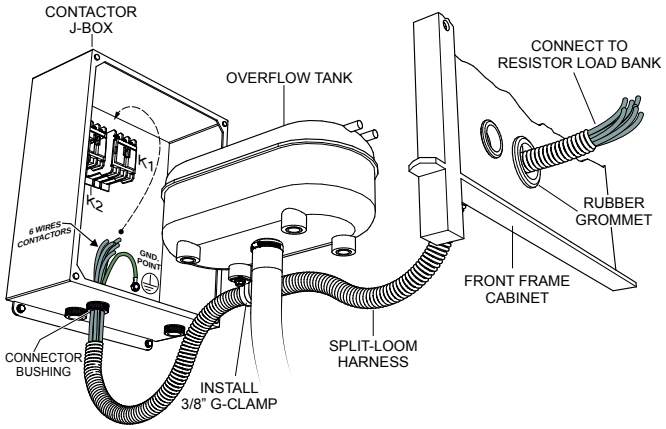

Figure 10. Load Bank Split-Loom Harness Routing

3. Next, continue routing the split-loom harness through the front cable connector bushing on the Contactor J-Box.
4. Position the 6 load bank wires near contactors K1 and K2.
5. Position the ***BLACK*** ground wire (Figure 10) near the Contactor J-Box ground point.

CONTACTOR J-BOX WIRING

There are two contactors (K1/K2) that require wiring via the Resistor Load Bank. Connect the six wires to the contactors as shown below:

1. Connect the ***six black wires*** coming from the Resistor Load Bank to the K1 and K2 contactors as shown in Table 3 and Figure 11. Tighen all wires to 40 in. lbs. (4.52 N·m).
2. Attach the BLACK 10 AWG. ***ground wire*** to the Contactor J-Box ground point. Tighten ground wire to 40 in. lbs. (4.52 N·m).

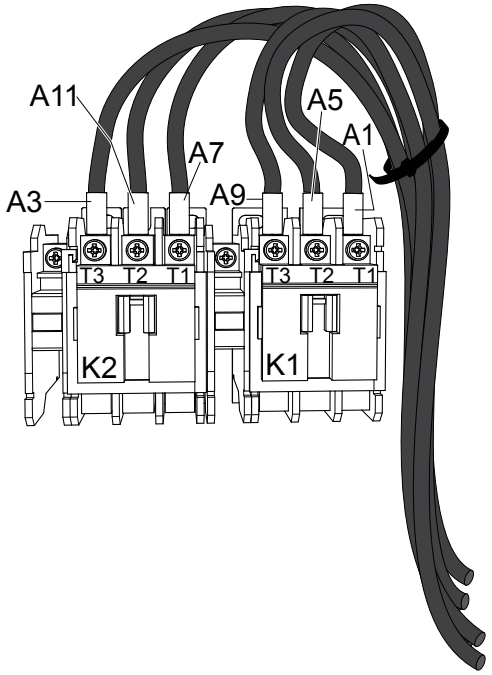

Figure 11. Contactor Wiring

Table 3. Contactor J-Box Wiring	
Load Bank Position	**Contactor (K1/K2)**
A1	K1-T1
A5	K1-T2
A9	K1-T3
A7	K2-T1
A11	K2-T2
A3	K2-T3
GND	GND Screw

FUSE WIRE HARNESS ROUTING

There is a fuse block located inside the Contactor J-Box that contains three 60 amp fuses (F1, F2 and F3). Position load wires to the fuse block as follows:

1. Insert four 8 AWG***. RED, BLACK***, ***BLUE*** and ***GREEN*** wires into the 40-inch ***fuse block split-loom harness*** (EE58515) as shown in Figure 12.
2. Once the wires have been inserted into the split-loom harness. Secure using tie-wraps.
3. Next, continue routing the split-loom harness through the rear cable connector bushing on the Contactor J-Box.
4. Position the 3 fuse wires (Figure 12) near the fuse block. If necessary, secure wiring with tie-wraps.
5. Position the ***GREEN*** ground wire near the Contactor J-Box ground point.

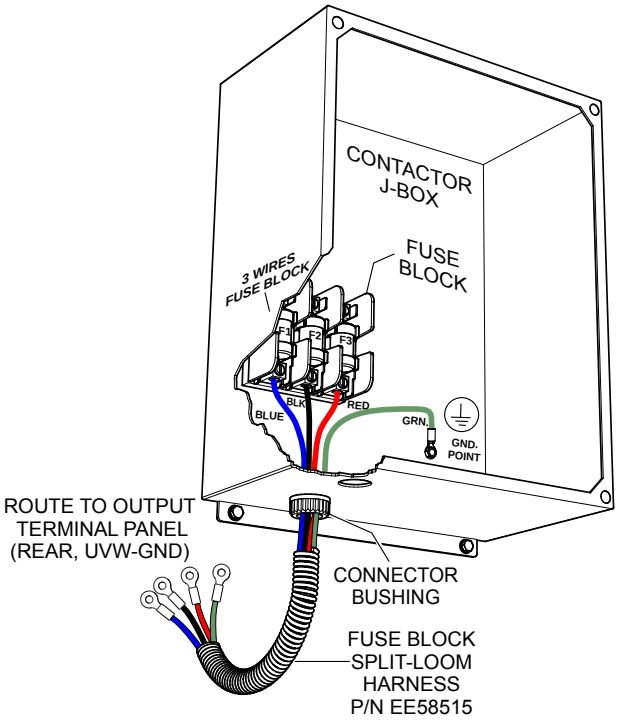

Figure 12. Fuse Connections

FUSE WIRE CONNECTIONS (UVW AND GND.)

1. Connect the three 8 AWG***. RED, BLACK***, ***BLUE*** wires to the load side of the fuse block as shown in Figure 12 and Table 4.
2. Tighten the nut securing the load wires to the fuse block to 60 in. lbs. (6.78 N·m)
3. Connect the ***GREEN*** 10 AWG. ***ground wire*** to the Contactor J-Box ground point as shown in Figure 12 and Table 4. Tighten ground wire nut to 40 in. lbs. (4.52 N·m).

Table 4. Fuse Wiring Connections (UVW)

Fuse	Color (Phase)	Wire Length (ft.) 8 AWG
F1	BLUE (W)	4
F2	BLACK (V)	4
F3	RED (U)	4

OUTPUT TERMINAL PANEL ENCLOSURE REMOVAL

1. Remove the four screws as shown in Figure 13 that secure the output terminal enclosure to the cabinet frame.

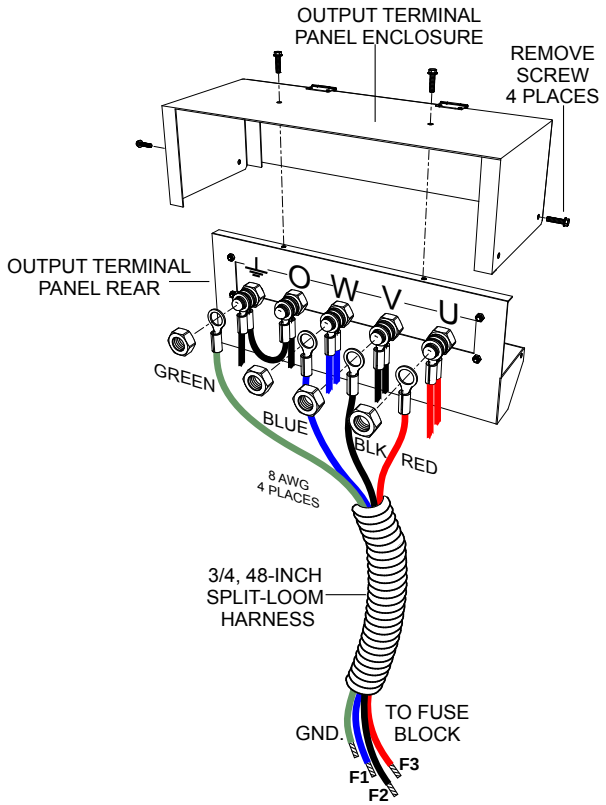

Figure 13. Output Terminal Panel Enclosure Removal

2. Lift and remove the enclosure from the output terminal panel. Set the enclosure aside.

OUTPUT TERMINAL PANEL (UVW-GND.) WIRE CONNECTIONS

1. Connect the four 10 AWG wires ***RED***, ***BLACK*** **BLUE** and ***GREEN*** to the rear of the ouput terminal panel as shown in Figure 13 and Table 5.

Table 5. UVW-GND Output Terminal Wiring	
Function	**Color**
U	RED
V	BLACK
W	BLUE
O[1]	N/A
GND.	GREEN
[1]Terminals O and GND. are bonded	

2. Once all four wires have been securely connected to the rear of the output terminal panel, re-install output terminal panel enclosure.

DC CONTROL SPLIT LOOM HARNESS (CONTACTOR J-BOX SIDE)

There are ***six*** wires, (P/N EE58517) that need to be connected to the Contactor J-Box. Connect the wires as shown below.

1. Insert the 6 wires into the 3/8", 54-inch ***DC Control split-loom harness*** (P/N EE58517).
2. Once the wires have been inserted into the split-loom harness secure using tie-wraps.
3. One side of this harness (Figure 14) has 6 wires with the insulation stripped back 1/2-inch. The other side has 3 terminal rings attached to the wires.

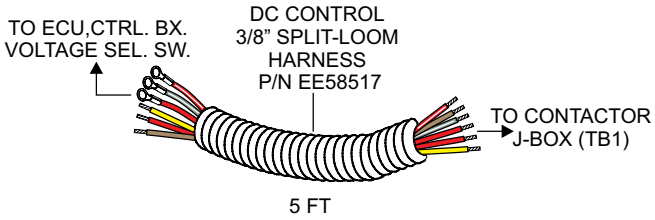

Figure 14. DC Control Split Loom Harness

4. Route the split-loom harness through the front right cable connector bushing on the Contactor J-Box. Be sure to route only the ***stripped wires*** up to the J-Box ***not the terminal ring side***.
5. Connect the six wires to the Contactor J-Box as shown in Figure 15 and Table 6.

Table 6. DC Control Wiring		
Color	**Contactor J-Box Terminal**	**Destination**
BROWN	TB1-1	ECU Pin-57
RED	TB1-2	ECU Pin-16
RED	TB1-2	VS Switch Pin-42
RED/WHT	TB1-3	10 AMP Fuse
GRN/WHT	TB1-4	Ground (Ctrl. Bx.)
YELLOW	TB1-5	ECU Pin-13

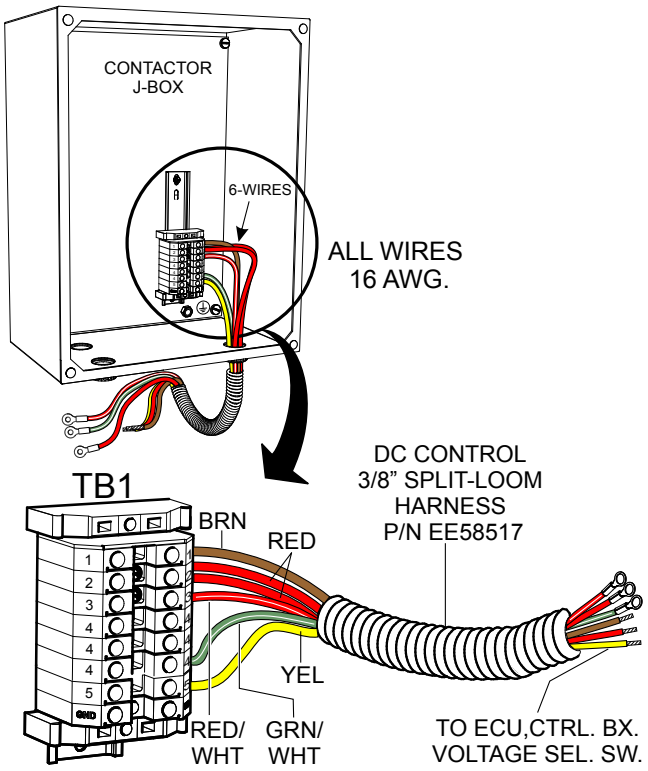

Figure 15. DC Control Wiring (TB1)

ECU 830 MODULE REMOVAL

1. Loosen the two panel release knobs (Figure 16) that secure the Control Panel to the cabinet frame.

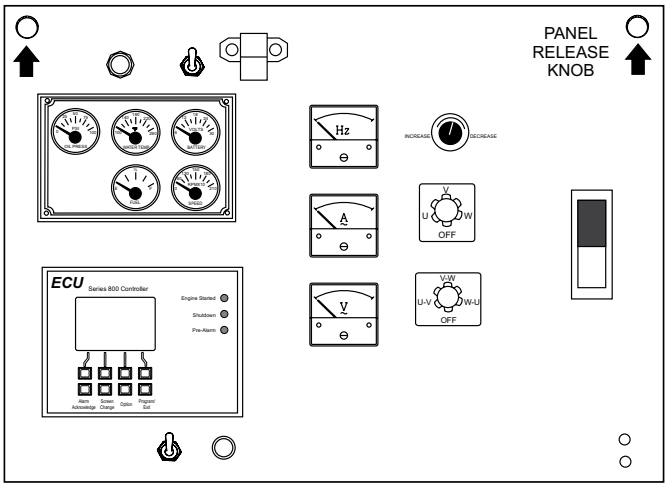

Figure 16. Control Panel

2. Once the release knobs have been loosened, gently lower the control panel. The backside of the ECU 830 control module is now accessible.
3. Remove all wiring connected to the existing ECU 830 control module.
4. Next, remove the four screws (Figure 17) that secure the existing ECU 830 control module to the Control Panel.

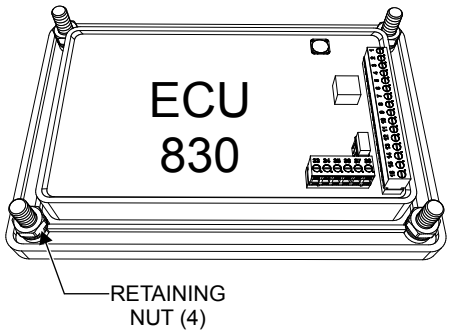

Figure 17. ECU 830 Module Removal

5. Discard the existing ECU 830 Module.

NEW ECU 835 MODULE INSTALLATION

1. Place the new ECU 835 module onto the Control Panel Secure module using the hardware as referenced in step 4 "ECU 830 Module Removal".
2. Re-connect wiring that was removed in step 3 "ECU 830 Module Removal". Reference Table 7.

Table 7. ECU 835 Wire Connections

Pin Number	Wire Color	Quantity
3	Green	1
4	Red/Orange	1
5	White	1
6	Brown	1
8	White	1
8	White	1
9	Black	1
9	Black	1
12	Pink	1
13	Yellow	1
14	Black/Red	1
16	Red	1
37	White	1
38	Black	1
57	Brown	1
58	Red	1

DC CONTROL SPLIT LOOM HARNESS (ECU, VOLTAGE SELECTOR SWITCH, ECU AND CONTROL BOX SIDE

1. Continue routing the free end of the DC Control split-loom harness through the bottom access hole (Figure 18) on the Control Box.

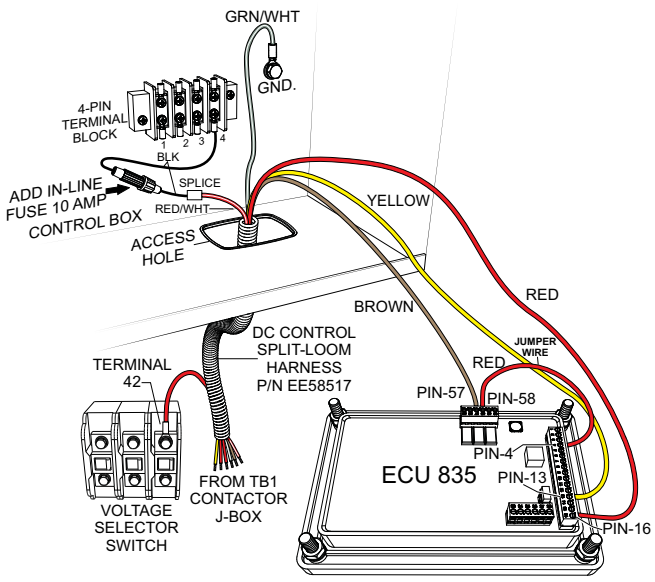

Figure 18. DC Control Split-Loom Harness

2. Connect the ***YELLOW***, ***RED*** and ***BROWN*** wires to the ECU module (pins 13, 16 and 57 respectively) as shown in Figure 18 and Table 6.
3. Next, connect the ***RED*** wire with the terminal ring to pin 42 on the Voltage Selector Switch.
4. Connect the ***GREEN/WHITE*** wire with the terminal ring to the Control Box ground point.

IN-LINE FUSE INSTALLATION

Reference Figure 18.

1. Insert a 10 AMP fuse into the fuse holder (P/N 303110).
2. Connect one end of the fuse holder wire (Figure 18) to the 4-pin terminal block located at the rear of the Control Box to terminal 4 (bottom).
3. Next, using a butt splice connector, connect the other end of the fuse holder wire to the ***RED/WHITE*** wire.
4. Once the wiring has been completed, raise the Control Panel back onto the cabinet frame and secure by turning the release knobs clockwise.

DECAL PLACEMENT

1. Place ***Power Balance*** decal (P/N EE57143) onto Control Panel as shown in Figure 19.
2. Next, place ***Patent Pending*** decal (P/N EE57145) onto Control Panel as shown in Figure 19.

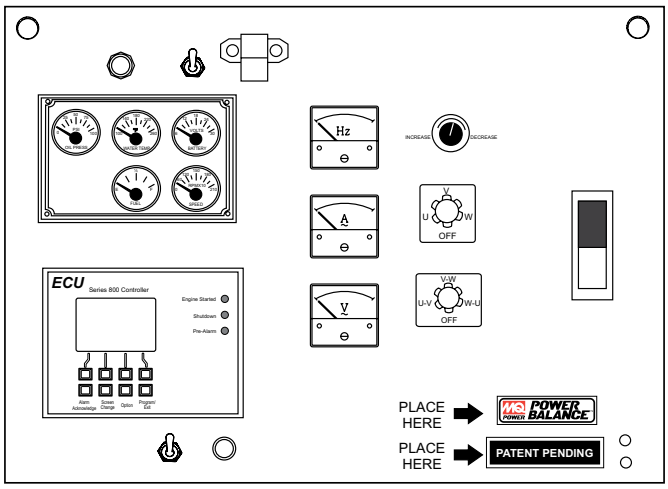

Figure 19. Decal Placement

3. Reconnect battery.

TESTING

Once the Load Bank is installed and ready to test, the ECU 835 Controller must first be updated with the latest firmware to support Load Bank operation.

> ***NOTICE***
>
> The firmware file must be in the main directory (no subfolders). Insert the flash drive into the USB port on the back of the ECU835 controller.

1. Obtain ECU 835 firmware file 0-0-12-0 JD 0-2-0-13.pfw and load to a USB flash drive.
2. Place ECU 835 into "Test Mode". Test mode is achieved by pressing and holding the ***hour check button*** (Figure 20).

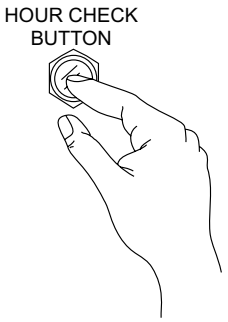

Figure 20. Hour Check Button

3. Next, place the Auto-Off/Reset Manual Switch (Figure 21) in the ***manual*** position.

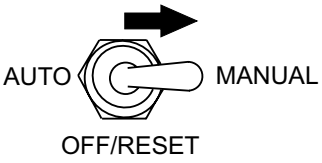

Figure 21. Auto-Off/Reset Manual Switch (Manual Position)

4. Release the hour check button. Once in test mode, log onto the ECU835 with the MQ Password.
5. Next, go to ***advanced options*** and select ***upgrade firmware***.
6. Select ***browse for file***, and then select the file from the USB. Once selected proceed with the onscreen instructions to complete the firmware update.
7. Once the update is completed, log back on to the ECU835 with the MQ password. Go to ***customer options*** then go to ***load bank settings***.
8. Verify and change settings to match the settings shown in Table 8. Use the "Set To" column values.
9. There are two set points that will need to be temporarily set at ***low*** values for testing purposes. Once testing is completed, set the ***Low Load Delay*** and ***High Load Trip Reset*** settings back to the "Set To" column as referenced in Table 8.
10. For testing, use the parameters listed below:
    - Low Load Delay, set to 2 minutes.
    - High Load Trip Reset, set to 1 minute.
11. The following test equipment will be required to complete the testing:
    - A stopwatch to confirm load bank is operating at the correct intervals.
    - External load bank capable of full load in each voltage position.
    - An ammeter to verify current in each voltage mode.
12. Connect the battery terminals and prime the fuel system. Check that oil, coolant and DEF fluid levels are satisfactory.
13. Verify the main circuit breaker is placed in the **ON** position.
14. Place the ***voltage selector switch*** (Figure 22) in the 3Ø-240/139 position.

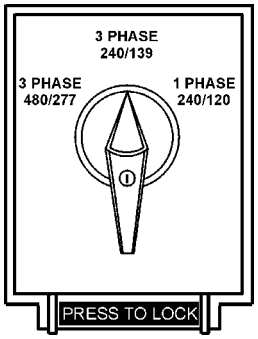

Figure 22. Voltage Selector Switch 3Ø-240/139 Position

15. Connect an external load bank to the output terminal panel as shown in Figure 23 and set up for selected voltage mode.

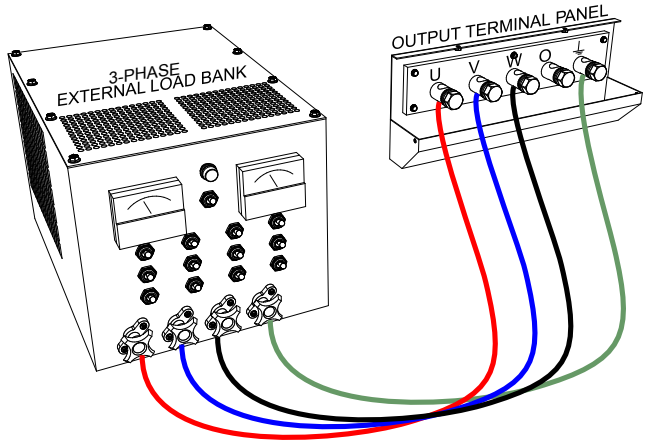

Figure 23. External Load Bank

16. Place ammeter clamp around Line 1 (L1) on the main circuit breaker.

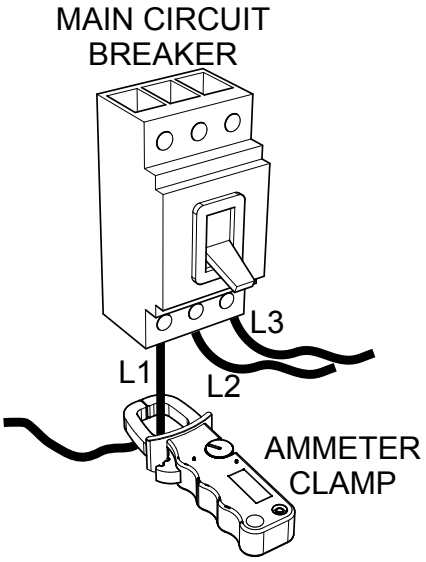

Figure 24. Attaching Ammeter Clamp

Low Load Delay

1. Start the genset and run at no load.
2. Using the voltage regulator adjustment knob, adjust voltage for 3Ø-240V

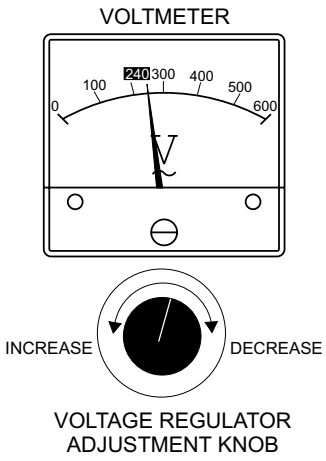

Figure 25. Voltmeter/VR

3. Start stopwatch.
4. The genset should run without the load bank engaging for the time set for "Low Load Delay". The test value should be 2 min, so after 2 min (may only take one min) the load bank should automatically turn **ON**.
5. A powered on Load Bank is indicated by a small "**L**" on the front screen of the ECU835 (Load Bank On). You should also hear an audible change in the engine load.
6. On line 1 of the main circuit breaker (Figure 24), the current measured at the ammeter should be approximately 48A with the ***voltage selector switch*** set at 3Ø-240V position without additional load from the ***external*** load bank. The ***internal*** load bank should stay on indefinitely.

High Load Level

The next step will test to verify that the internal load bank turns off if a ***high load level*** is reached.

1. With the genset still running and the ***internal*** load bank on, begin applying load from the ***external*** load bank and add load steps equal to a value of approximately 40% of rated load (22-23 kW) for a 70 kVA genset.
2. The internal load bank should remain on. Run for a couple of minutes and then in one additional step, apply an additional 25 kW step from the ***external*** load bank.

3. This should be enough load to exceed the "High Load Trip" set point and drop out the ***internal*** load bank. This can be verified by a small "**T**" on the front display of the ECU835 (Torque Exceeded).
4. The "T" should remain for the duration of the "High Load Reset" (60 seconds for test). Once the ECU timer has elapsed, the "**T**" will go away.
5. The ECU control module is now verifying if the load is above the acceptable load setting (50%) which it should be while at 80% external load. The ***internal*** load bank should not attempt to reengage.
6. Remove the external load bank and begin a new stopwatch sequence.
7. After the (Low Load Delay) timer elapses (approximately 2 minutes for test), the ***internal*** load bank should come back on. This completes the test for this voltage position.

Using the same procedure repeat for 3Ø-480V and 1Ø 240V.

480V Position Load Bank Testing

For 3Ø-480V, the load bank line current should be about half of what was measured in the 3Ø-240V mode, approximately 24A. Add 25kW step then an additional 25 kW step to trip on High Load Trip.

240V Position Load Bank Testing

1. For 1Ø-240V, the load bank line current should be about 54A. This will only be on **L1** and **L3** when in single phase mode.
2. Add 109 amps to trip on High Load Trip, usually a 50 kW step on a 3Ø load bank.
3. As mentioned earlier once testing is completed, set the Low Load Delay and High Load Trip Reset settings back to the values as shown in the "Set To" column. Reference Table 8.
   - Low Load Delay set back to 10 min.
   - High Load Trip Reset set back to 600 Seconds.

Table 8. ECU 835/840 MQ Customer Settings (Load Bank)				
DCA70 JDT4 Interim Firmware Version 0-0-12-0 JD 0-2-0-13.pfw				
Menu	**Set Point Name**	**Default**	**Set To: Value**	**Unit of Measure**
Load Bank Settings	Load Bank Enable	1	1	1=ON 0=OFF
	Low Load Trip	46	50	% Torque
	Sufficient Load Trip	45	50	% Torque
	High Load Trip	80	92	% Torque
	Alt Low Load Trip	45	45	% Torque
	Alt Sufficient Load Trip	45	45	% Torque
	Alt High Load Trip	80	65	% Torque
	Low DOC in Temp C	300	300	°C
	Low Load Delay Min	10	10	Min
	Regen Low Load Delay	10	0	Sec
	Load Bank Dwell Min	0	60	Min
	High Load Second Trip	0.1	0.1	Sec
	High Load Second Reset	60	600	Sec
	Idle in Load Enable	0	0	1=ON 0=OFF
	Idle in Load PA	3	3	Sec
	Idle in Load SD	60	60	Sec
	Excessive Idle Enable	0	0	1=ON 0=OFF
	Excessive Idle PA	10	10	Min
	Excessive Idle SD	15	15	Min
Load Bank 2	DPF TCON High Temp C	1700	1700	°C
	DPF TCON High Temp Dwell M	1	1	Min
	DPF TCON Low Temp C	-200	-200	°C
	DPF TCON Low Temp Dewll M	1	1	Min
	H Enable	0	0	1=ON 0=OFF
	H Count	1	1	
	TDR Cycle Enable	0	0	1=ON 0=OFF
	TDR Insuff Load Min	120	120	Min
	TDR Loadbank On Min	90	90	Min
	Fault Detect. Enable Second 30	5	5	Sec
	Enable Load Always On	0	1	1=ON 0=OFF
	Idle > Rated Reenable Sec	5	5	Sec

DCA70SSJU4i

19.6 kW Load Bank Installation

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

UNITED STATES

Multiquip Corporate Office

18910 Wilmington Ave.
Carson, CA 90746
Contact: mq@multiquip.com

Tel. (800) 421-1244
Fax (310) 537-3927

MQ Parts Department

800-427-1244
310-537-3700

Fax: 800-672-7877
Fax: 310-637-3284

Service Department

800-421-1244
310-537-3700

Fax: 310-537-4259

Warranty Department

800-421-1244
310-537-3700

Fax: 310-943-2249

Technical Assistance

800-478-1244

Fax: 310-943-2238

CANADA

Multiquip

4110 Industriel Boul.
Laval, Quebec, Canada H7L 6V3
Contact: jmartin@multiquip.com

Tel: (450) 625-2244
Tel: (877) 963-4411
Fax: (450) 625-8664

UNITED KINGDOM

Multiquip (UK) Limited Head Office

Unit 2, Northpoint Industrial Estate,
Globe Lane,
Dukinfield, Cheshire SK16 4UJ
Contact: sales@multiquip.co.uk

Tel: 0161 339 2223
Fax: 0161 339 3226

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